

and so economise funds and resources. It is undoubtedly clear that certain branches of research must be conducted away from the central institution. But the Conference are of opinion that that institution should be gradually strengthened as circumstances permit.

The Conference also concurred fully in the view accepted by the Provisional Committee that certain parts of the scheme should be first carried out, and that the rest should follow as funds permit. They concurred in giving preference to Parts I. (Scientific and Technical) and II. (Medical) and leaving Part III. (Philosophical and Educational) to follow, though they were of opinion that the promoters of the scheme and its governing body ought to keep in view the scheme in its entirety. They were also of opinion that the scheme of studies and of subjects should be stated in the most general terms, and that provisions should be made for its revision from time to time so as to leave the authorities in charge of the work as free a hand as possible in taking up subjects that seemed specially at any time to demand attention, and in conforming to the progress of science. In regard to bacteriology, they were quite prepared to postpone action, both because there are many subjects to which the funds may at the first be at least as usefully applied, and also because they understood that the Government of India are taking such action as seems at present necessary in regard to this subject. They think that probably the best application of their funds to this subject, for the present at least, will be the provision of studentships in the Government institutions.

The Conference considered the question of the site of the central institution. It seemed to them that of all the sites named the choice lay between Bombay and Bangalore. In regard to the former the main considerations were (1) the fact that it is the home of the founder (who, however, rather favours Bangalore); (2) that it is a great centre of commercial and industrial activity; (3) that it is easy of access from all parts of India and from England; and (4) that a strong governing body could be easily obtained there. On the other hand, the climate, though not altogether unfavourable, is not bracing, and is injurious to machinery and apparatus. It would not be so favourably regarded by Europeans as Bangalore, and in Bombay land is not available in sufficient quantity. If (as is believed) special concessions in respect to site, and aid in regard to the scheme generally, be made in Bangalore on condition of the institution being there, the Conference would recommend that site.

The Conference considered the name or title of the institution. There was a strong opinion in favour of the title "Institute" as more suitable than "University" to the objects in view. But in deference to the views of Mr. Tata, and in consideration of the sentiment of the educated community of India, the Conference decided that it was expedient to adopt the well-known title of "University." They, therefore, decided to recommend that the institution be styled "The Indian University of Research." They were, however, of opinion that it should maintain its post-graduate character, and that it should, therefore, grant not degrees but fellowships.

The Conference are unanimously of opinion that there is great need for such an institution as has been indicated; that there is no reasonable ground for doubt that its work would be successful; that it would exercise a most beneficial influence on higher education and on the development of the resources of the country; and they strongly recommend it to the sympathy and support of the Government of India. They trust the Government of India will express their favourable opinion on the scheme, and give the promise of necessary legislation to be carried out as soon as it is matured, so that an appeal may be made to the public for funds, and that the details of the scheme may be definitely settled.

The Conference then proceeded to revise the Draft Bill and determined to recommend the Draft Bill as revised to the Government of India for publication. And at the request of Mr. Tata they resolved to ask the Government of India to nominate some officer to consult with him about the transfer of the property with which he proposed to endow the University.

The *Gazette of India* gives the following outline of the Tata University scheme:—It is proposed to found an institution which shall be or correspond to a teaching University for India, its primary aim being to teach, not to examine. Diplomas, therefore, will be conferred on those who have completed a certain course of higher education. This work of higher instruction will be conducted on principles followed now in Europe—e.g. in German Seminaria, French Conferences, and English and

American Research Classes. These courses will be the beginning of a purely specialist training. In order not to interfere with the existing agencies, the new institution will take up teaching where Colleges and existing Universities leave off. The new courses will be post-graduate. The new specialist courses, which are post-graduate, will naturally be professional and technical, rather than simply literal school sanitary and science practice. For qualified medical men a school of pedagogics for those intending to be higher secondary teachers (inspectors, head-masters, &c.), and a school for higher studies, are some of the obvious directions of the development. It is not proposed to take all these up at once. The order in which they may be proceeded with will be best arranged by the committee. It is not intended to cut off the post-graduate students from education in Europe. It is contemplated to select the best for further training in Europe or America, with a view to their future return to this country. It will be necessary to make ample provision for scholarships and fellowships, both for the students in the institution and for those who proceed from it to Europe or America. The development of a scheme so complete must entail a vast capital annual expenditure, the construction of libraries, laboratories and museums, and the invitation to specialists to teach and prosecute research. All this must require large sums of money. A committee has been formed to secure the necessary financial support by making a general appeal for funds to take the preliminary steps in connection with the scheme, and to obtain a short legislative enactment enabling the institute to hold property.

His Excellency the Governor, the Chancellor of the University of Bombay, has kindly consented to let it be known that the proposed scheme has his personal approval and sympathy.

The Government of India accept the recommendations of the Conference, and they desire to place on record their appreciation of the generosity and public spirit displayed by Mr. J. N. Tata in making his munificent offer of an endowment for the proposed University of Research. They are confident that the proposed University will meet a great need, and will contribute to the advancement of higher education and the development of the resources of the country. They will be ready to proceed to legislation as soon as the scheme has been matured in all its details. They wish the undertaking every success. In accordance with the request made by the Conference, the Government of India have requested the Government of Bombay to nominate an officer to arrange with Mr. J. N. Tata for the transfer of the property with which he proposes to endow the University.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

DR. F. KOHLRAUSCH, president of the physikalisch-technischen Reichsanstalt, has been appointed honorary professor of physics at Berlin.

MR. G. F. HARDCASTLE, senior assistant in the chemical department of the Technical College, Huddersfield, has been appointed instructor in dyeing, and assistant in chemistry, at the Municipal Technical School, Leicester.

THE Annual General Meeting of the Association of Technical Institutions will be held on Wednesday, January 24, at the Mercers' Hall, London. The president (Earl Spencer, K.G.) will preside, and an address will be given by the president-elect, Sir Swire Smith.

A COURSE of fifteen lectures on organic chemistry will be given at the Goldsmiths' Institute, New Cross, S.E., on Friday evenings, at 8.30, by Mr. W. J. Pope, commencing on January 19. Particular attention will be paid to the discussion of recent work and current views relating to organic chemistry.

THE University of Pennsylvania's free museum of science and art at Philadelphia, one of the late Dr. William Pepper's cherished hopes, was, says *Science*, formally opened in the presence of several thousand people on December 20. Immediately following the presentation to the board of trustees of the museum, a bronze statue of the late Dr. Pepper, the gift of friends, was unveiled. Mrs. Pepper, the widow of Dr. Pepper, has presented to the university trustees, as her memorial to the memory of her husband, a gift of 50,000 dollars, as a fund to carry on the work started by Dr. Pepper.

THE dissertation for which Mr. H. N. Dickson has received the B.Sc. research degree of Oxford University was "On the circulation of the surface waters of the Atlantic north of 40° N. lat." The work consisted primarily of a chemical and physical examination of the surface waters of the North Atlantic during the twenty-four successive months of the years 1896 and 1897. For the purpose of the investigations special arrangements were made for the continuous supply of samples by officers of ships trading in the North Atlantic. The results were exhibited in monthly charts showing the distribution of temperature and salinity, and the changes during the period are fully discussed. The existence of definite seasonal changes in the circulation has been established by the investigation.

WITH a view to encourage the adoption of scientific methods in the teaching of physical geography, the authorities of the Cambridge Local Examinations have issued a syllabus of a course of work which has several commendable characteristics. In the first place, it is distinctly stated at the head of the syllabus that "The object of the examination will be to ascertain as far as possible to what extent the candidates' powers of observation and reasoning have been cultivated." Even more noteworthy than this remark is the schedule which accompanies the syllabus and contains an outline of a course of practical instruction designed "(1) to develop the power and habit of observation; (2) to give the pupils clear and accurate conceptions of natural phenomena and their relations; and (3) to enable them to seek for the causes and rational explanations of the phenomena which they observe." Among the subjects in which practical instruction is to be given are: the drawing of sections from contour maps, the study of local land-forms, the use of meteorological instruments, the study of ocean current maps, simple astronomical observations, the determination of time and latitude, and the use of the terrestrial globe. It is to be hoped that the efforts of the Cambridge authorities to encourage the scientific study of the earth will meet with success. No subject stands in greater need of rational methods of instruction than geography.

THE English Education Exhibition, which was opened by H. R. H. the Prince of Wales at the Imperial Institute on Friday last, contains the materials from which the English educational exhibits for the Paris Exhibition will be chosen. The whole field of educational activity in this country is more or less satisfactorily represented by these exhibits, though a walk through the galleries shows the initiated observer how impossible it is to materialise certain factors of educational effort, which though intangible are none the less real and powerful. Every step in a career from the kindergarten to the university can be followed by the inspection of the objects collected in the different sections. It is satisfactory to be able to record that the equipment necessary for proper instruction in science takes a prominent place in the collections sent by nearly all the elementary schools, most of the secondary schools, the technical institutes, and the colleges of university rank. Hand and eye training is evidently now almost universal, for one exhibit after the other contains admirable examples of wood-work, metal-work, clay-modelling, and miscellaneous occupations of a varied kind having the same end in view. We noticed with some satisfaction an etching of Charles Darwin in the Shrewsbury School exhibit; even if he received little encouragement in science at the school, it is quite clear the authorities are proud of him.

SCIENTIFIC SERIALS.

Wiedemann's *Annalen der Physik und Chemie*, No. 12.—Magnetic deflection of kathode rays, by E. Wiechert. The velocity of kathode rays is determined by deflecting them at two different points of their path by currents of a Lecher wire system slightly retarded with respect to each other. The velocity comes out as about one-seventh of that of light, and the mass transported with each electron is about 1/1300 part of an oxygen atom.—Relation between electric conductivity and pressure, by G. Tammann. Gaseous ionisation is reduced by increase of pressure, while the ionisation of a solution is increased. In incompletely dissociated solutions, an increase of conductivity with pressure is observed. Thus, a deci-normal solution of acetic acid is reduced in resistance to one-half its original value by a pressure of 2500 atmospheres.—An experimental and theoretical fallacy in electrical doctrine, by E. Lecher. The author maintains that a magnetic line of force

can in no sense be defined as a line along which a positive pole would move, and that as a matter of fact a pole never moves along a line of force.—Distribution of free electricity at the surface of a Crookes' tube, by E. Riecke. The author uses a mixture of red lead and sulphur to discover the free charges on the outer surface. The fluorescent patch is marked by a wide ring of sulphur, the interior of which is marked by irregular patches of red lead, showing negative charges distributed irregularly, probably owing to want of symmetry in the kathode. The remainder of the tube is coated with sulphur, except the portion behind the kathode, which is negative again.—Strains in Rupert's drops, by K. Mack. Rupert's drops show black on the screen in polarised light, but they can be made to show their colours by immersing them in a trough containing a liquid of the same refractive index, such as cedar oil or a mixture of carbon bisulphide and ethyl ether. The colours resemble those of peacock's feathers.—Magnetic deflection of Becquerel rays, by F. Giesel. The deflection may be demonstrated by means of a polonium preparation attached to a sensitive plate laid face downwards across the poles of an electro-magnet. The deflected rays on the negative show a curious hairy structure.—The photography of current curves, by J. Zenneck. Instead of using a sliding plate or a revolving mirror with the Braun kathode tube, the author produces the current curve direct upon the screen in the kathode tube.—He uses two deflecting magnets, one for producing the oscillation due to the current under investigation, and the other for imparting to the kathode beam a lateral movement proportional to the time.

Memoirs of the Novorossian (Odessa) Society of Naturalists, vol. xxii. Part 2.—The whole of this volume is given to the results of the exploration of the *liman* (salt lake) of Kuyalnik, situated near Odessa, which exploration was undertaken several years ago by the Odessa University. Most of the volume is occupied by a most exhaustive report, by A. Wassilieff, about the astronomical, topographical and bathymetric work made in connection with this liman. A large scale map (1:16,800) of the lake and several vertical profiles accompany the report, which will be a precious document for all subsequent exploration.—The rest of the volume is taken up by a paper, by L. Silberberger and M. Weinberg, on the bacteria found in the mud of the liman. They originate partly from the surrounding air and partly from the waters entering the lake, their composition varying with the seasons. The mud is not favourable for the life of the bacteria, which add to the mud by their decay.

In the *Journal of Botany* for December 1899, the most important article is by Dr. A. B. Rendle, Notes on *Xyris*, in which several new species are described.—Messrs. J. A. Wheldon and Albert Wilson conclude their paper on the mosses of West Lancashire. In the number for January 1900 we find papers on *Sphagnum medium* in Britain, by Mr. H. W. Monington (with a plate).—Some Welsh hawkweeds, by the Rev. Augustin Ley, in which one more is added to the long list of British "species" of *Hieracium*.—On some species of *Cracca*, by Messrs. Jas. Britten and E. G. Baker.

THE *Journal of the Royal Microscopical Society* for December 1899 contains a continuation of Mr. F. W. Millett's paper on recent Foraminifera of the Malay Archipelago, and the usual summary of current researches in zoology, botany and microscopy. In the latter section several valuable recent novelties in microscopic construction are described. This number also contains the list for 1899 of new terms introduced during the year in zoological and botanical literature.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 23, 1899.—"Note on the Spectrum of Silicium." By Sir Norman Lockyer, K.C.B., F.R.S.

The recent observations show that the lines of silicium may be divided into three sets, no two of which behave alike under varying electrical conditions. The wave-lengths of the lines composing the different sets are:—

3856.1		
3862.7	A.	
4128.1		
4131.1		
4089.1	B.	4552.8
4116.4		4568.0
		4575.3